

THE
STATE
OF THE
TRADE
AND
MANUFACTORY
OF
IRON
IN
GREAT-BRITAIN
CONSIDERED.

Printed in the Year 1750.

THE
ST. ALBANS

OF THE
TOWN OF
ST. ALBANS

MANUFACTORY

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The STATE of the
T R A D E
A N D
M A N U F A C T O R Y
O F
I R O N, &c.

IT is necessary to premise something, concerning the Method of making *Iron*, and the different Sorts and Qualities of that Metal ; in order to explain *Terms*, without understanding of which, our first Apprehensions of Things may be erroneous, our Notions confused, and Conclusions ill-grounded.

Iron-Ore is a Mineral, that abounds in most parts of the Earth ; and there is no considerable Tract of this Globe, wherein probably it may not in some shape or other be found. It is not to be converted with Advantage into good malleable Iron with any other Fire, that we know of, but what is made of Wood, Charkt or Charcoal. The first material Alteration it undergoes, is in the *Furnace*, wherein it is melted, becomes a fluid Substance, and is let out into Gutters made in Sand, bearing an imperfect Resemblance to

Iron-Ore.

Furnace.

Pigs. a *Sow* with her *Pigs* sucking, from whence it has the Name of *Pigs* and *Sows*. All Iron in this state is brittle and unmalleable, not capable of being manufactured, or worked into any other Shape than what it is cast into, and consequently adapted to few Purposes.

Forge. *Pig-Iron* is brought from the *Furnace* to the *Forge*; and there by being melted and digested in the Fire becomes a fixt and malleable Substance; and by repeated Heats in the Fire, and repeated Impressions of the Hammer, is beaten out into long Bars or Palifadoes, and upon that Account is termed Bar-Iron. *Furnaces* and *Forges* are comprehended under one common Name of *Iron-works*.

Iron-works. *Bar-Iron* is of several sorts, distinguished by particular Names, according to its Dimensions and Uses. The two most general are *Merchant-Bar* and *Mill-Bar*: The one being such shaped Iron as is usually imported by the Merchant, about an Inch and half or two Inches broad and one third thick, and Squares of different Sizes. The other such as is proper for the *Slitting* or *Rolling-Mill*, of double Dimensions to the former. The *Slitting* or *Rolling-Mills* are Water-Engines, whose Use is to reduce Bar-Iron into small Rods, or thin Plates, in order to save the Expence of Charcoal and Human Labour*.

Besides

* *Mill-Bar* is often drawn out with a Pitcoal Fire, but if with Charcoal, does not require near the same Quantity as fine Merchant-Bar which is capable of being drawn out with a Charcoal Fire only, consequently these Engines where Charcoal

Besides the general Qualities belonging to all Iron, there are many peculiar Qualities, whereby one sort of Iron is distinguished from others, and is more proper for particular Uses. The principal of these, and which we have only at present Occasion to take Notice of, are, *Hardness*, *Softness*, *Toughness*, and *Brittleness*. These are supposed to be unalterable Qualities arising from the Original Nature of the Ore.

Qualities
of Iron.

Hardness is that Quality of Iron, whereby it yields not easily to the Stroke of the Hammer when hot, nor to the friction of the File or other fretting Instrument, when *Cold*; *Softness*, the contrary. Of *Hardness* partakes more or less all the Iron imported from the *Baltick*.

Hardness
and Soft-
ness.

Of *Softness*, all the *British* and *American*. *Toughness* is that Quality of Iron, whereby it is not easily broken by bending: And *Brittleness* the contrary; the highest Degree of which is, when it will not bend at all, but snaps asunder like Glass. This sort of Iron is termed

Tough-
ness and
Brittleness.

by *Mechanicks Cold-short*, in Opposition to another vicious Quality of some Iron which is termed *Red-short*, because when red hot, it cracks and falls to Pieces under the Hammer. Iron of a middle Nature between *Tough* and *Cold-short*, is termed *Ordinary* if it approaches towards *Tough*, and *Blend* if it approaches

Cold-short
and Red-
short.

coal is so expensive as in *Great Britain*, are of the utmost Importance; but in such Countries as *America*, where Charcoal is so exceeding plenty, Iron might be so minutely hammer'd out at the Forges, as to render these Engines of no such Consequence, but that a Manufactory may be very well carried on without them.

towards

towards *Cold-short* ; and admits of all Degrees of one or the other Quality. *British* and *Plantation* Irons (as for what has come to our Knowledge,) are of similar Qualities in all the sorts ; and tho' one sort of *British* or *Plantation* Iron may be hard with Respect to another sort of *British* or *Plantation* Iron, yet compared with the Northern Iron they are all relatively soft ; and consequently not proper for Conversion into Steel.---Iron is converted into Steel, by being put, (with pulverized Charcoal along with it,) into a large Crucible, and there heated for a considerable Time by an external Fire, the Mouth of the Crucible being closely stop'd. All Iron is supposed to be convertible into some sort of Steel or other. The *Swedish Orgrund Iron*, though the best that we can get, is not the best in the World for this Purpose ; the *German Steel* vastly excelling what we make, which is attributed not to any Difference of Skill in the Conversion, but to a natural Difference in the Iron converted.

Manner of
making
Steel.

German
Steel.

Having thus given a short Sketch of the Method of making Iron, and the different Sorts and Qualities of it, so far as is requisite to a clear Comprehension of what has or may be said upon the Subject before us: Let us now consider the Interest of *Great-Britain* in supplying herself with this most useful of all Metals. That this, and every other Nation, as far as they conveniently can, ought to supply themselves with so expensive a Commodity,

the

the Use of which is so absolutely necessary to their Well-being and Happiness, and the making of which employs so great a Multitude of Hands, is a Proposition that needs no Proof.

That *Great-Britain* does not wholly supply herself, (Steel only excepted,) is not owing to any natural Defect or Incapacity. Not to want of Ore, for in that respect Nature has been very liberal. There are few Counties in *England* wherein probably it may not be found: The Chalybeate Springs are a sufficient Ground for this Conjecture. *Cumberland* and *Lancashire*, are supposed capable of answering the Purposes not only of this Nation, but even of the Universe. Neither is it owing to a want of Soil proper for the Production of Wood; more than a sufficient Quantity of Land in this Kingdom being so naturally productive of it, that nothing but the constant Use of the Plow and Mattock can keep it under. ⁵¹ ~~1307~~ Neither will any one (we believe) attribute this Defect to want of Industry in her Inhabitants, or of Rivers for moving of Iron-works, in which Respects few Nations can vie with her. The true Causes of this Deficiency are two.

First, The Woods of this Kingdom, being grubbed up and destroy'd, at such Time when they were esteemed an Incumbrance, and when the Consumption of Iron was very inconsiderable to what it is at present: But now our Iron-works are again reviving, there is no doubt, by a proper Attention, and Regard to our Wood-Lands, this Objection will be removed.

The

Great-Britain naturally capable of supplying herself with Iron.

The other principal Cause is, The Disproportion between the Price of Labour, Lands, and the Products of Lands, in *England* and the Northern Countries, which is so great, that (considering the present Duty on their Iron) the *British* Maker must be undersold by the importing Merchant in *Swedish* Iron, tho' the Price of Cord Wood was as low again as it is now; and in *Russia*, though the Woods were had for the felling only.

The Importance
of making
Pig and
Bar-Iron.

The making of Bar-Iron from the Ore is no such inconsiderable Branch of Trade as some People would have us imagine, for though it be distinguished from the working of Bar-Iron into Wares, which bears the Name of the Iron Manufactory, yet it is in itself a very considerable Manufactory: It requires and maintains near as many Hands per Ton, as the working of it afterwards, into Nails and other coarse Wares. It has been computed, and we believe with Fidelity, that within some few Years past, there has been made here of *British* Materials, eighteen thousand Ton per Annum.* There are Works yet in being sufficient for that, or even a larger Quantity. The making of eighteen thousand Ton of Iron, is the Support and Employment of twenty seven thousand Hands, and twenty seven thousand Families: It affords

* The Charge of Wood, Ore, and Rent of Works, in a Ton of Iron valued at seventeen Pounds, does not amount to above four Pounds twelve Shillings, the Remainder, twelve Pounds eight Shillings, is Labour and Carriage; and Labour, exclusive of all other Charge, is at least ten Pounds per Ton, and the making of two Tons must employ at least three Hands of such Labourers as are made use of in that way.

affords an Expence of above three hundred thousand Pounds *per Annum* in the Countries where the Works are situate; the Absence of which so large a Sum, by the Destruction of the Works, must not only affect the Wood-lands and Coppices, but the Rents of all other Lands in those Parts, and sink the Value of their Produce; must be the Ruin of Thousands, and the Impoverishment of all.

British Timber labours under the same Disadvantages as *British* Iron; it is underfold by Deals and other foreign Woods. Calculate the Value of the Land it shades for a Century or two, and it will by no Means answer to us or our Posterity for the Preservation of it; how much less will it do this, when the Tops and Buts, which now cut into Cord-wood, and are of one third Value of the whole, will then become useless and of no Account? *Great-Britain* now not only supplies herself, but *Ireland* likewise, with Oak-bark for tanning of Hides, and converting them into Leather. Should the Coppices be destroyed, (and surely they are not worth preserving for the sake of the Bark only) she and her Sister *Ireland* must both go a begging for it abroad; no doubt there are those who will be very ready to supply us; there is enough in *America*, it will ride very well along with *American* Iron, and, freighted in *American* Bottoms, will greatly increase our Trade and Navigation: According to some Men's way of thinking, it is our Interest to have every Thing from abroad.

The pernicious
consequences of the
American
Schemes.

A transient View from *Sweden* to *America*, without any intermediate Prospect, will shew the Scheme of being supplied from thence in a very advantageous Light. Certainly at first Sight it must appear vastly more eligible to be supplied from our own Plantations, than from foreign Nations ; from Countries with whom we enjoy a free and open Trade, than from those with whom our Trade is greatly limited and restrained ; from such who will take our Goods in Exchange, than from such to whom we are obliged to pay a large Balance in Specie. This is indeed what swims upon the Surface, but Truth lies at the Bottom of the Well.

Let us draw the Curtain aside, and take a View of the *British*, *American*, and Northern Iron ; the *American* (as appears by what has been imported in Bars from thence, and likewise by what has been refined from Pigs here) is of the same soft Nature as the *British*, and consequently being imported, must first supply the Place of the *British*, before it can any way affect the *Swedish* or *Russian*. And as the *American*, (as appears by the Evidence of our Adversaries) cannot be afforded so cheap as the *Swedish* and *Russian*, of Consequence the Importation of it must affect the *British* only, but will not be capable in the least of supplying the Place of the *Swedish* and *Russian*. But suppose we admit the *American* might be imported as cheap or cheaper than the *Swedish* is at present, the Event would be, that the *Swedes* would be obliged to lower, or quite take off their own large Duty, being equivalent to

3 l. 12 s. 6 d. per Ton ; and then, even upon this Supposition, would be enabled greatly to undersell the *American*. The Scheme therefore of importing Bar-Iron from thence, to any advantageous Purpose, as Things are at present, is utterly impracticable, and will serve to no other End but to destroy the *British* Woods and Iron Works, and to diminish the *British* Manufactory.

Formerly our Colonies were entirely supplied with *Iron* and Iron Ware from hence : But since the Erection of Iron Works there, *New-England* now not only furnishes herself, but the other Colonies likewise with sundry Sorts of Iron Wares, whereby the Demand for Scythes, which formerly was very large from thence, is now come to nothing. The Ax, and other Edge-Tools, and Nail-Trade thither, are annually diminishing. But an Increase in our Trade, proportional to our Colonies, might reasonably have been expected ; and would certainly have followed, had not Forges been there erected. The Erection of more Forges, will naturally produce more Manufactories ; and the *Americans* will soon supply themselves with every Thing in that Way, which now they have from *Great-Britain*. We are told indeed, that they are forced to manufacture by Necessity, that is Poverty. But how can this be, in a Country where Labour, (as we are informed by the same Persons,) is so dear, and Provisions so cheap ? Those, who can gain almost as much again by their Labour, as the People of *Great-Britain*

Britain do, and yet they have Provisions at half Price ; how can they be unable to purchase our Iron-wares, when they can have them that Way cheaper, than they can make them for themselves ? We are told likewise that the Importation of their Iron Duty free, would prevent their manufacturing. We might as reasonably expect, that they would not cut Tobacco for their own Use. There is indeed a Necessity for their manufacturing, but of a quite different Nature from what has been represented : A Necessity that will not be removed by the Importation of Bar-Iron from thence ; but will subsist as long as there are Forges there, and increase upon the Erection of more Forges. It is a Necessity of the strongest Nature, arising from Profit and Gain. The *American* Manufacturer, by the Cheapness of his Iron, the Profit of manufacturing it at home, and by saving the many Expences, Disappointments and Damages, that must necessarily attend exporting his Bar-Iron to *England*, and importing the manufactured Goods back again to *America** will have an Advantage of 45 *l. per Cent.*

* Carriage of the Iron from the American Forges ?
to the Sea-ports. _____ }
Freight of Ditto _____ to *London*. _____
Wharfage, weighing, &c. _____
Carriage to the Inland Parts to be manufactured.
Ditto of the Wares back to *London*. _____
Packing and Freight to *America*. _____
Damage by Rust contracted in Water Carriage. —
Profit to the Importer of the Bars. _____
Profit to the Exporter of the Wares. _____
Profit to the Ironmonger. _____
Insurance in Time of Peace. _____
Ditto in Time of War. _____

Cent. Besides this, he had lately, and probably now has, a large Premium allowed him for Nails and Scythes by the Government of *New-England*, payable out of their publick Treasury. It is said, that we have an Advantage of the *Americans*, in Respect of the Price of Labour, but that Labour in general is as dear, or almost as dear again as in *Great-Britain*, in a Country represented most wretchedly poor ; and where Land and Provisions are known to be extremely cheap ; and where the Use of Slaves prevails, (one of which may be purchased for one Year's Wages of a *British* Artificer) is an Assertion repugnant to the Nature and Reason of Things ; it is an Assertion, that will prove as strongly, that they cannot make Bar-Iron, as that they cannot manufacture it, greater Labour being necessary in making that, than in working it into Nails, and other such coarse Wares as we send there.* The same may be said of the Objection taken from the Heat of the Climate : Furnaces and Forges being vastly hotter than the Shops of Manufacturers, that of an Anchor-Smith only excepted. Besides, our Plantations on the Continent, (except *Georgia* and *Carolina*,) notwithstanding their Southern Situation, are rather intemperately cold than hot. The Objection taken from the Dearth of British Coal in those Parts, is of no Weight, as they have Pit-coal of their own Produce : Besides, Wood, for Charcoal, in
great

* Besides a Negroe will sooner learn to make Nails than to Coal Wood or to work at a Furnace or Forge and will be easily confined in a Shop whereas in cutting or coaling of Wood he will have always an Opportunity of running away.

great Plenty, which will answer the same Ends;

The Objections against their manufacturing being thus weak and trifling and the Advantages in doing it so very extraordinary, it is ridiculous to imagine they will ever furnish us with any considerable Quantity of Bar-Iron, till they have first furnished themselves with such Iron and Iron-ware as they have Occasion for.

It has been urged in Favour of the *American* Scheme, "That in Exchange for their Iron, the Colonies will take more of our woollen and other Manufactures." That by these Means we shall lose our Iron Trade thither is certain, but that they will take more of other Goods is uncertain: The same Reasoning would hold were the Colonies to supply us with an hundred or two hundred thousand Pounds of Hops, Wheat, or any other Article; yet from such an Exchange, were it certain, (as we are naturally capable of supplying ourselves) would this Nation receive an Advantage? When large Quantities of *Flemish* Hops were imported into this Kingdom, a Petition would have been full as reasonable for encouraging Hops from *America*, as it is now for Iron; but the Wisdom of Parliament, by laying a further Duty on *Flemish*, and all other foreign Hops, has now enabled us wholly to supply ourselves with that Commodity, as we might with Iron were the like Encouragement given.

The *American* Scheme, therefore, by destroying the *British* Iron Works, will lose this Nation three hundred thousand Pounds a Year; and

and by ruining that part of our Manufactory, which now supplies *America*, one hundred thousand Pounds a Year more : But by not being capable of injuring the Northern Works, will not any way lessen that large Ballance we now pay to *Sweden*, but probably oblige us in a short Time to pay an equal or larger Ballance to our own Plantations. Instead of rendering *Great-Britain* independent of her Northern Neighbours, it will rather render *America* independent of *Great-Britain*, and subject *Great-Britain* to a double Dependency. It will take the Bread in effect out of the Mouths of several thousand *British* Families, and give it to barbarous Herds of Criols and Negroes. Lastly, It will sink our Rents, destroy our Coppices, discourage the Preservation of Timber for the Navy, and Bark for the Support of the Leather Manufactory, in order only to improve and cultivate the *American* Forests : Countries which in time to come will have no more regard to *Great Britain*, than we now have for the native Places of our *Saxon* Ancestors.

F I N I S.

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T. I. V. I. R.